



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/564,146

02/22/2007

Stefan Dickopf

87232

6120

22242 7590 07/22/2009  
FITCH EVEN TABIN & FLANNERY  
120 SOUTH LASALLE STREET  
SUITE 1600  
CHICAGO, IL 60603-3406

EXAMINER

SAKELARIS, SALLY A

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

07/22/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/564,146	<b>Applicant(s)</b> DICKOPF ET AL.	
	<b>Examiner</b> Sally A. Sakelaris	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-17 and 28-33 is/are pending in the application.
- 4a) Of the above claim(s) 3 and 18-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-17 and 28-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/11/2006 7/14/2006</u> .                                     | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claims 1, 2, 4-17 and 28-33 are drawn to a sensor arrangement, classified in class 422, subclass 82.09.

Group II, claim 18 is drawn to an optical measurement arrangement classified in class 422, subclass 55.

Group III, claims 19-24 are drawn to a method of manufacturing a sensor arrangement classified in class 436, subclass 164.

1. The inventions listed as Groups I-III lack unity of invention because even though the inventions of these groups require the technical feature of a sensor arrangement comprising radiation-conducting substrate which includes a first and a second surface, wherein the first surface is a radiation passage area through which radiation of a given wavelength range may be coupled into the substrate as well as coupled out of the substrate, this technical feature is not a special technical feature as it does not make a contribution over the prior art in view of Dickopf et al. (US2001/0026943A1).

Dickopf et al. teach a sensor arrangement with a first (Fig.2b (10)) and second (Fig. 2a on top of (20)) surface wherein the first surface is a radiation passage area through which radiation of a given wavelength range may be coupled into the substrate (10, 20) and a second surface comprises a plurality of sensor fields which are designed to reflect radiation of a given wavelength range from the substrate (10, 20) which is incident at a predetermined angle range (Fig. 1a, 2a, and 2c)

The shared technical feature of Groups I-III above is therefore not a special technical feature as it does not make a contribution over the prior art.

Art Unit: 1797

2. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are directed to related products. The related inventions are distinct if:

(1) the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect; (2) the inventions do not overlap in scope, i.e., are mutually exclusive; and (3) the inventions as claimed are not obvious variants.

See MPEP § 806.05(j). In the instant case, the inventions as claimed have a materially different design, mode of operation, function or effect because invention I is drawn to a sensor arrangement and invention II is drawn to an optical measurement arrangement with an optical means, radiation source, and detector. Furthermore, the inventions as claimed do not encompass overlapping subject matter and there is nothing of record to show them to be obvious variants and thus the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect; the inventions do not overlap in scope, i.e., are mutually exclusive; and the inventions as claimed are not obvious variants.

Inventions I and III and II and III are related as process of making and product made.

The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the products of groups I and II could be made with a materially different method without gold in the SPR suitable layer.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a

Art Unit: 1797

serious search and examination burden if restriction were not required because one or more of the following reasons apply:

- (a) the inventions have acquired a separate status in the art in view of their different classification;
- (b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;
- (c) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing different search queries);
- (d) the prior art applicable to one invention would not likely be applicable to another invention;
- (e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

**Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.**

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.

Art Unit: 1797

If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

During a telephone conversation with Tim Levstik on 7/6/2009 a provisional election was made with traverse to prosecute the invention of Group I, claims 1, 2, 4-17, and 28-33. Affirmation of this election must be made by applicant in replying to this Office action. Claims 3 and 25-27 were cancelled and claims 18-24 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise require all the limitations of the allowable product claim will be considered for rejoinder. All claims directed to a nonelected

Art Unit: 1797

process invention must require all the limitations of an allowable product claim for that process invention to be rejoined.

In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product are found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained.

Withdrawn process claims that are not commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder.** Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 1, 2, 4-17, and 28-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Art Unit: 1797

The phrase "a/the given wavelength range" in claim 1, five times, is a relative amount which renders the claim indefinite. The term "range" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. According to the teachings of the specification on page 9, Fresnel's formula is required to calculate the correct description of the polarized light. However, the claim does not recite a value for  $\theta$ , the refractive index of the substrate ( $n$ ), or the extinction coefficient ( $\kappa$ ), and therefore the "given wavelength range" is indefinite. Appropriate correction is required.

Similarly, the phrases "a predetermined angle range", "reflectivity lower than 0.5", and "higher than 0.95" in claim 1 are relative amounts which render the claim indefinite. The term "reflectivity" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. According to the teachings of the specification on page 9, Fresnel's formula is required to calculate the correct description of the polarized light. However, the claim does not recite a value for  $\theta$ , the refractive index of the substrate ( $n$ ), or the extinction coefficient ( $\kappa$ ), and therefore any phrase modifying the "reflectivity" is indefinite. Appropriate correction is required. A potential correction could include the composition of each portion of the separating agent layer.

Applicant should note that for purposes of examination, the art has been applied in light of the above indefiniteness.



Art Unit: 1797

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1, 2, 4-17 and 28-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dickopf et al. (US2001/0026943A1) in view of Stark (US2002/0056816).

With regard to claims 1, 2, 4-6 and 28, Dickopf et al. teach a first (Fig.2b (10)) and second (Fig. 2a on top of (20)) surface wherein the first surface is a radiation passage area through which radiation of a given wavelength range may be coupled into the substrate (10, 20)

Art Unit: 1797

and a second surface comprises a plurality of sensor fields which are designed to reflect radiation of a given wavelength range from the substrate (10, 20) which is incident at a predetermined angle range (Fig. 1a, 2a, and 2c) as well as separating regions (110) for separating the individual sensor fields (120) from the respectively adjacent sensor fields (120) capable of absorbing radiation of from the substrate, which is incident at the predetermined angle range (Fig. 1a, 2a, and 2c), so as to produce a contrast between the sensor fields and the separating regions being formed by a separating agent layer (Figure 4, 110, 115, 120 and 125). The separating agent layer is capable of adjusting a reflectivity lower than 0.5 for radiation of the given wavelength range from the substrate, which is incident at the predetermined angle range, at the interface between the separating agent layer (110, 115, 120, and 125) and the substrate (10), at least in a first region (115, 116 or 117). The separating agent layer is capable of an extinction higher than 0.95 for radiation of the given wavelength range, at least in a second region (between 116 and 110) located above the first region, on the side opposing the substrate (10).

Furthermore, Dickopf teach that it is generally preferred to configure the separating means and the SPR sensor surface areas so that the reflectivity of the SPR sensor surface areas is always greater than the reflectivity of the separating means, also in the resonance range in the SPR sensor surface areas ([0015]).

With regard to claims 1-6 and 28, Dickopf do not teach the separating layer structure that is comprised of one or both of titanium, silicon, or germanium.

Stark teaches a surface plasmon illumination system that consists of an array of apertures (holes and slits) formed in a structure consisting of a dielectric substrate coated with a conductive metal film on one or both surfaces, or by a thick metallic film, and which further

Art Unit: 1797

incorporates means for confining the electronic surface excitation to an area immediately adjacent to the apertures where light exists the structure. The means for confining the electronic surface excitation preferably takes the form of a layer of material having dielectric properties (123, 127) that differ substantially from those of the illuminated metal layer (126, 129), and may consist of a dielectric insulator, a "bad metal" having different dielectric properties (Pg. 3 [0024]). Figures 4, 7, 10, and 20). The metallic film layers are taught to be gold, silver, and titanium among others (Pg. 7 [0066]). The dielectric, "bad metal" layers are taught to consist of germanium for example (Pg. 7 [0066] and [0064]).

Notwithstanding the capability of the Dickopf apparatus to produce the reflectivity and extinction amounts as stated above in light of the present indefiniteness issues, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Dickopf separating layer in light of the teachings of Stark by adding the appropriate metal and "bad metal" layers including germanium and titanium for the expected benefit as taught by Stark that "by applying the principles of the present invention, a significant reduction in the size of the area illuminated by each aperture is achieved, resulting in significantly improved resolution"(Pg.3 [0017]).

With regard to claims 7-11 and 29-32, Dickopf et al. teach in FIG. 4b. polymer 116 acting as a light (arrester) conductor. What is important, however, for this basic function is to dimension the layer 116 preferably so thick that no more than one to two reflections to the glass plate 10 occur since it is here that there is always some of the light which penetrates back into the glass.

Dickopf does not teach the exact thickness as claimed for each layer.

Art Unit: 1797

Stark teach in FIG. 13, a 200 nm thick metallic structure ([0060]). FIG. 1 shows a cross section of an optically thick metal film 101. The term "optically thick" means that the thickness of the film 101 is greater than two times the skin depth. For all essential purposes, this means that there is no direct coupling of the surface plasmons (coherent collective excitations of electrons) at the upper surface (the interface between media of index  $N_{\text{sub.1}}$  and  $N_{\text{sub.2}}$ ) and the lower surface (the interface between media of index  $N_{\text{sub.3}}$  and  $N_{\text{sub.2}}$ ). In a typical case, the indices  $N_{\text{sub.1}}$ ,  $N_{\text{sub.3}}$ , and  $N_{\text{sub.4}}$  are equal while  $N_{\text{sub.2}}$ , the index of the metal film 101, is substantially different and the metal film 101, unlike the surrounding material, is a conductor of electronic charges ([0051]). If the thickness of metal layer 115 in the hole interior were greater than skin depth, the effects seen in optically thick metal films as shown in FIG. 1 would be duplicated from the standpoint of optical transmission through the holes. However, a smaller and more concentrated output light pattern is achieved by limiting the propagation length of SPs at the exit surface to the thickness of the film in the hole. Limiting the size of the excited surface area surrounding the hole exit produces a concentrated, circular light pattern as seen in FIG. 8 rather than prolate pattern seen in FIG. 3, thus limiting the size of the light source in only one of its two dimensions. As is the case with the structure shown in FIG. 4, the indices  $N_{\text{sub.1}}$ ,  $N_{\text{sub.4}}$  and  $N_{\text{sub.5}}$  may be equivalent to 1 in the simplest configuration but other combinations be used to tune the holes for a specific resonance. FIG. 9 graphs the steeply skirted intensity distribution expected across the circular light pattern along the line 9-9 of FIG.8) [0058]).

It would have been obvious to one skilled in the art at the time the invention was made to have used the sensor field and separating regions of Dickopf with the materials and principles

Art Unit: 1797

taught by Stark to make the layers of the 1<sup>st</sup> and 2<sup>nd</sup> region of the separating agent layer such that the greatest contrast between the two is created by doing so in addition to the resolution being increased and since where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art.

With regard to claims 12-17 and 33, Dickopf et al. teach a SPR sensor array wherein in the flat plane at least 100, preferably 10,000 sensor surface areas/cm<sup>2</sup> are provided (Pg. 10, Claim 88). Furthermore, the difference in thickness of the separators (110) as compared to that of the SPR sensor surface areas (120) is in the range 0.05 to 5mm and the sensor surface area density should be at least 100, better 1000 sensor surface areas per cm<sup>2</sup> (Pg. 4 [0047]).

It would have been obvious to one skilled in the art at the time the invention was made to have used the proportions of Dickopf's sensor field and separating regions as Dickopf provides that their ability to make such an array is an advantage of their invention over the prior art since it is not just suitable for very large sensor surface areas (Pg. 4 [0047]).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sally A. Sakelaris whose telephone number is 5712726297. The examiner can normally be reached on Monday-Friday 8-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on 5712721267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1797

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Sally Sakelaris

/Jill Warden/  
Supervisory Patent Examiner, Art Unit 1797